

# Arts & Sciences

**UNCW**

*Biology*

*from Greek, bios "life" + logia "study of."*

*Nuc. juglans Virginiana alba &c?.*  
The Hiccoery Tree .

The Pig - nut

The red bird



## MESSAGE FROM THE DEAN

Welcome to a new issue of the *Arts & Sciences Magazine*.

If you're a regular reader of this publication, you've come to expect a lot of variety in the stories we tell. That variety isn't difficult to achieve. After all, ours is a comprehensive arts and sciences college where disciplines as different as chemistry, theatre, sociology and philosophy all share a place. With such breadth and diversity in the teaching, research and service that make up the work of our college, we won't run out of great things to tell you about any time soon.

The feature story in this issue, "Biology: Study of Life," shows how this breadth and diversity can be found *within* a single department. Even those of us who have daily contact with UNCW's biologists can easily forget how much ground they cover. And, with UNCW's sterling reputation in marine science, it's often the "marine" part of biology that we think of first. But, the most remarkable thing about the Department of Biology and Marine Biology is its across-the-board excellence in all aspects of the discipline. Marine biology? Check. But also, cellular and molecular biology, systematics, physiology, genetics, environmental biology and more. They do it all, and they do it very well.

Like their colleagues in other departments within the college, UNCW biologists create the "powerful learning experience" that is this university's hallmark.

In the College of Arts and Sciences (CAS), we define a powerful learning experience as "one that incorporates a liberal education in the broad range of humanistic and scientific studies, a mastery of discipline-specific theories, concepts and methods, and an immersion in applied learning. This, we believe, is an education for the 21st century." These words come from the CAS Vision Statement.

The stories we share in these pages are examples of our efforts to make that vision a reality. I hope you enjoy them.

Best regards,



David Cordle, Dean  
College of Arts and Sciences



UNCW/JAMIE MONCRIEF



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The Magazine of the College of Arts & Sciences at the University of North Carolina Wilmington

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We like to mention students who contribute to *Arts & Sciences Magazine*. Michael Escobar '12 photographed fellow music student Heather Bobeck for "Arts: A Creative Conversation."

Escobar is majoring in music with a Spanish minor. "My instrument is classical guitar. I started taking music seriously in my sophomore year." He is a graduate of Isaac Bear Early College High School.

"I'm 19," Escobar says, "and have had a lot of opportunities to explore. I'm in a band called Radiant Soles, and we're working towards recording our second album."

# Lookout for Books that Matter

by Lindsay Key '11MFA

For Edith Pearlman, the choice to publish a book with Lookout Books, the brand new literary imprint of the UNCW Department of Creative Writing, was a good one.

Within a month of its release, *Binocular Vision: New and Selected Stories* won the attention of more than 25 national media outlets, including the *New York Times* and *LA Times*, and was featured on the cover of the *NYT Book Review*'s Jan. 16 edition.

Lookout Books was co-founded by Emily Smith '06MFA, director of the UNCW Publishing Lab, and Ben George, editor of *Ecotone*, the creative writing department's award-winning literary magazine. Since its inception, *Ecotone* has been published in the university's decade-old Publishing Lab, a teaching press that offers students the opportunity to learn the publishing process through apprenticeship.

"*Ecotone* was achieving national success. To bridge the gap between the magazine and Publishing Lab, we decided to establish a new literary imprint and solicit book-length manuscripts from the pool of regular *Ecotone* contributors," Smith says.

## Among these writers, they found Pearlman.

At age 74, Edith Pearlman has won three O. Henry Prizes, her stories have appeared in *Best American Short Stories* and *The Pushcart Prize Anthology*, and she has published three previous collections. Still, her writing had not achieved widespread recognition.

"She's really an exquisite writer, but she's not so widely known," George says. "We saw an opportunity with this volume of new and selected stories to do a grand book for her. And we do have a luxury that some commercial publishers, which have to worry primarily about profit-making, don't. Our tagline for Lookout is 'a haven for books that matter.' It's wonderful to be concerned only with that."

Students were involved in every step of publishing *Binocular Vision*, including discussions about the selection and order of the stories, as well as cover design and typesetting.

Smith and George also received help from a rotating advisory board of creative writing faculty that included department chair Philip Gerard, David Gessner, Clyde Edgerton, Sarah Messer, Robert Siegel and Rebecca Lee.

The challenge, according to George, was to select the perfect mix of new and previously published stories to showcase Pearlman's range.

"From the beginning my experience with Lookout Books was personal and gratifying," says Pearlman. "Ben and Emily found gigs and interviews for me. The students in the MFA program devoted themselves to discussing the selection of stories and their order and also to tasks I don't even know about. In fact, much was done that I don't know about, but it all resulted in this unexpected success which is delighting us all. I feel like royalty."

The imprint's second release will be Steve Almond's *God Bless America*. Almond put the book together himself and sent it to several independent publishers. Scheduled for release in October 2011, the book differs from Pearlman's in that it has a more overarching theme and agenda, George says.

"My take on it is that he's trying to present as full a portrait of contemporary America as he can through these different snapshots. It's a composite work," George says.

The third and fourth books published by Lookout will be collections of poetry and essays. The best way for aspiring authors to introduce their work to the imprint is to submit to *Ecotone*.



UNCW/JAMIE MONCRIEF

left to right: Emily Smith '06MFA, director of UNCW Publishing Lab, Ben George, editor of *Ecotone*, Edith Pearlman, author of *Binocular Vision*.



## Ron Vetter is Editor-in-Chief of *Computer Magazine*

by Kim Proukou '06M

UNCW Professor of Computer Science Ron Vetter has been selected as editor-in-chief of *Computer*, the flagship publication of the IEEE Computer Society – the world's largest professional association for the advancement of technology. The UNCW professor of computer science will serve a renewable two-year term with the publication which covers all aspects of computer science.

One of his primary goals is to preserve and augment both online and printed media with enhanced digital resources.



Right now, Vetter says, "We don't have the systems readily available to replace print. We are not there, yet. Print is still more convenient. At least for now, paper is forever."

What Vetter hopes is to make the most of both communication vehicles "using the editorial process to make the best decisions as to what information should be placed where – online, in print or both," he says.

For example, Online Plus is a new publication model that IEEE is expanding. A hybrid of print and online, subscribers can receive some information in print, plus interactive disks of the contents of each issue and full archival online access. Plans are underway to develop a prototype digital edition of *Computer* magazine by the end of May 2011, test it to a sampling of subscribers thereafter and make it available to all subscribers in January 2012.

Vetter is a senior member of the IEEE Computer Society and continues to serve as IEEE's associate editor for *Computing Now*, IEEE's one-stop source for free limited-time access to peer-reviewed magazines, journals and conference proceedings.

Vetter is a past chair of the Department of Computer Science at UNCW. In 2007, he co-founded Mobile Education LLC, a technology company that specializes in developing interactive short message service applications. Vetter has published more than 95 journal, conference and technical papers and has served as the principal investigator (PI) or co-PI on grants and contracts exceeding \$5 million.

## Fighting Fire with Fire

by Kim Proukou '06M

*"Prescribed, controlled burns, done on a regular basis, ensure the continued health of our fire-dependent longleaf pine ecosystem."*  
— Roger Shew, lecturer in geology and environmental studies

Geoscientist Roger Shew '76 and Bob Buerger, professor of environmental studies, use prescribed burns as resource management and teaching tools.

"When we started planning rotational burns in our campus forest," Shew says, "the goals were threefold. First, minimize the possibility of a severe wildfire by removing fuel load. Second, improve the health and sustainability of our longleaf pine wiregrass ecosystem by removing competitive shrubs and litter that shade out the wiregrass and prevent reseedling of longleaf pines. And third, very important to the university mission, is the educational component of the prescribed burns."

Burns are teaching labs for many classes such as Advanced Natural Resource and Wildlife Management and other ecology and environmental science courses. Shew says, "Students learn to assess the health of the forest, monitor the actual burn and evaluate the results of the burn."

The data students collect will permit future classes to evaluate the long-term impacts of prescribed burning "for disease control, forest management and health of the entire ecosystem," Shew says.

Bill Walker of the N.C. Forest Service was instrumental in the planning and execution of the most recent burn on campus in February. The plan is to perform prescribed burns on a three- to five-year rotational basis.

"This will insure that we meet our threefold goals," Shew says.



# Doug Gamble

## PROFILE

by Natalie Price '11

At UNCW, field research is the most important aspect of the geography curriculum. By applying problem solving skills and stimulating creativity in a real geographic space, hands-on field experience exemplifies professor of geography Doug Gamble's teaching philosophy. It's also fun to get out of the classroom and into a pair of hiking boots.

Geography asks questions about the world and considers critical problems and issues of space, climate and the environment. Just as historians think of how an issue evolved over time, geographers think of how issues evolve over space. "Everyone is a geographer to a certain degree," says Gamble. "What you learn in geography helps you understand what you already know a little bit better."

When he was eight, Gamble's father's job relocated the family to Australia from Ohio. At a young age, he discovered the diversity of the world. "Being exposed to the different landscapes and societies out there, I always knew there was exciting stuff to go out and explore," says Gamble. This awareness and a love for the magazine *National Geographic* led him down the road to becoming a geographer. The experience also gave him his first understanding of spatial perspective.

As a professor, Gamble tries to enlighten students' knowledge not just of places but of the physical and human processes that affect those places. In the classroom, he emphasizes the importance of problem-based learning, creativity and field research when studying geography.



UNCW/JAMIE MONCRIEF

Many of Gamble's assignments focus on problem-based learning, a student-centered strategy of learning that emphasizes collaborative group reflection and analysis. He instructs his students to consider human or physical systems, such as agriculture or climate – then consider their relation to surrounding geographic phenomena within place, region and landscape. This "spatially-oriented perspective of the world" allows students to think on a broader scale.

He also encourages his students to use their creative imagination to approach the problem from diverse perspectives, not just to focus on coming up with a solution – finding that less direct instruction gives students more freedom to explore their own systems of analysis and discover their own solutions.

Some of his current graduate students are working on research projects as diverse as investigations of Caribbean cave temperatures and sea level rise as well as flooding in Brunswick County.

After receiving his M.A. and Ph.D. at the University of Georgia, Gamble taught at Mississippi State. At UNCW, Gamble's teaching has earned him a number of formal recognitions including the 2010 Chancellor's Teaching Excellence Award. He has received regional and national recognition from several geographic societies as well.

The North Carolina Geographical Society recognized Gamble as Educator of the Year in 2009. That same year, he received the 2009 Southeastern Division Association of American Geographers Teaching Excellence Award, an award he is particularly proud of because the recognition came from his peers.

With three other UNCW faculty members, Gamble edited the publication, *The North Carolina Geographer*, a peer-reviewed journal that includes short essays, lesson plans, profiles and book reviews, from 2004 to 2007. Gamble also maintains several active research projects, particularly in the Caribbean and Bahamas as well as flood hydroclimatology projects in the southeastern United States involving both undergraduate and graduate students. Several students have co-authored journal articles.



GAMBLE

left to right: Dan Hillegass '12M, Matt Ball '09, Marc Lithman '13M, Rob Romanowski '08 install a rain gauge on San Salvador, Bahamas for a study of precipitation patterns on the island.



HEMERA/THINKSTOCK



# UNCW oceanographer joins NASA to study surface salinity via satellite

by Lindsay Key '11MFA



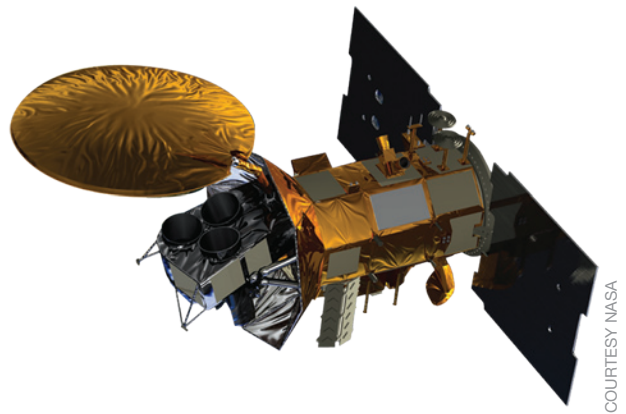
UNCW/JAMIE MONCRIEF

Measuring the hydrologic cycle, the global circulation of water, is a major challenge for scientists.

Eighty-five percent of the hydrologic cycle occurs over the ocean, nearly unobserved because measurements of rainfall and evaporation are difficult to make at sea. Instead, scientists can measure sea surface salinity, which is a good proxy for the hydrologic cycle. Salty areas receive little rain and a lot of evaporation and fresh areas, the opposite.

Frederick Bingham, professor of physics and physical oceanography, is part of a team of scientists using satellite measurements to determine ocean surface salinity levels. NASA and the Argentinean space agency CONAE jointly fund the project, known as the Aquarius/SAC-D mission.

The Aquarius satellite, scheduled to launch in June 2011, will measure sea surface microwave emission. These readings can be translated into sea surface salinity readings using a sophisticated algorithm that takes into account the surface temperature, sea state and other factors.



COURTESY NASA

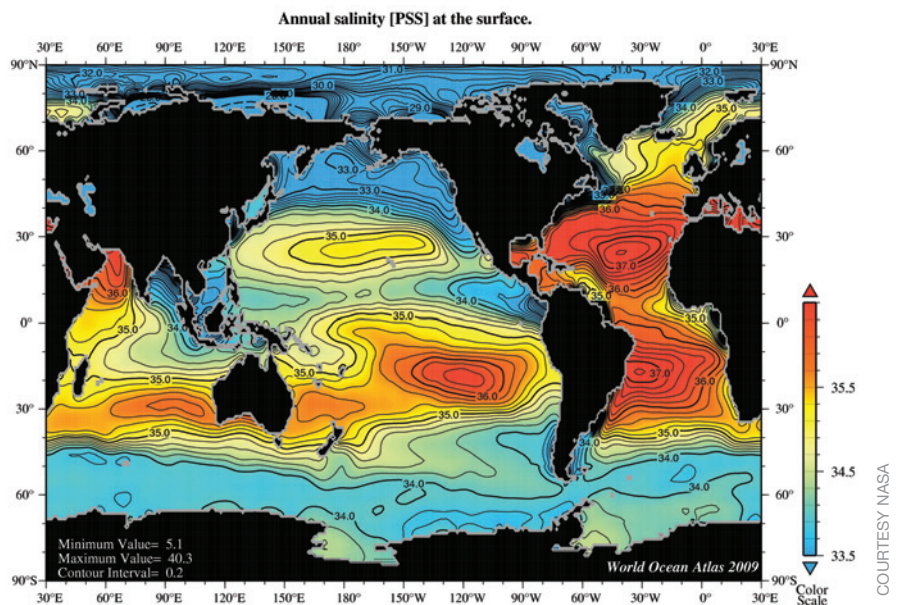
With the help of Montserrat Fuentes, professor of statistics at NC State University, Bingham retrieves the satellite data from a shared website and checks against surface salinity readings taken by Argo floats: small, drifting oceanic robotic probes that sink as deep as two kilometers and surface every 10 days, measuring salinity and temperature on their journey to the surface.

Approximately 3,000 Argo floats are deployed worldwide, but it would take an untold number of Argo floats to measure the data available from one satellite pass. If proven accurate, the improved number and quality of satellite salinity readings will forever change the field of

oceanography, making possible the study of ocean salinity patterns from an encompassing, bird's-eye perspective.

Monitoring ocean salinity is especially important in the context of global warming; as the earth heats, the hydrologic cycle appears to be accelerating.

"Surface salinity is changing just like everything else," Bingham says. "Places where surface salinity is high seem to be increasing. In other words, the salty areas of the ocean are getting saltier while the fresh areas are getting fresher." The potential impact of this phenomenon on earth's ecosystems is not yet known.



This image illustrates average sea surface salinity over the globe as measured by floats and research ships. It shows high salinity areas in the middle of the subtropical oceans, indicating high evaporation and little rainfall. Low salinity areas are seen in the tropics and at higher latitudes, areas with more rainfall and land runoff. The Atlantic is generally saltier than the Pacific. The Aquarius mission hopes to understand how this average picture is changing in a warming climate.

# A R T S:

## A Creative Conversation

by Kim Proukou '06M

For Heather Bobeck '11, becoming a voice major “was an accident.”

“I was going to be a scientist or a doctor,” she says. “But, while I was taking science courses, I bought a student ticket to a lyric opera for \$20 – when I was living and going to school in Wisconsin. I liked music. I had always been in choir, but never wanted to do it – until I saw an opera, and I just wanted to be the lead role, so badly.”

At UNCW, music students receive intensive performance training in professional settings.

Bobek pursues training in technique, repertoire, languages and musicianship under the direction of Nancy King, associate professor of music and coordinator of vocal performance. “It is amazing to have a vocal teacher who is also a great performer herself,” Bobek says.

“I don’t think there are very many schools like UNCW where you get so many opportunities or get as many professors who care about you both professionally and personally.”

### Interpretation in Music Performance

Bobek performs four times a week. Each week, the seminar class is conducted as an actual professional audition where students introduce themselves and their music and perform.

“It is an opportunity to hear what everyone is doing, practice actual performance, including walking on, bowing and to watch and learn from each other,” Bobek says. “By the time you get to juries (competitions), you are ready with full sets that you have performed many times before, which gives you a lot of confidence.”

King likes to compare vocal performance to athletics. But, “actually,” she says, “it is more,” because of the additional role of “interpretation.”

“The mind and body can be trained to know the score. But, it is the self, the sum of biology, maturity, sensitivity, creativity and experience that must interpret and produce this performance, at this time, in this place, for this audience.

“To fold in the history of the music, to ask how the music was created – and what it is you, the performer, want to communicate to the audience,” King says, “that type of mental flexibility requires a highly sophisticated mind. You have to be a researcher.

“Scientists ask questions, and so should the artist. What was the poet’s intention; the composer’s purpose? Study that and integrate that knowledge into your performance.”

PHOTOS BY MICHAEL ESCOBAR



Heather Bobeck



PHOTOS.COM/THINKSTOCK



Bobeck says, “Research is like having more colors open for you, if you were to paint. Singers must know *what* is sung, but also, *why* you are singing – what the character is thinking and feeling.”

According to King, you are on the path to mastery when you can interpret a score of music and make it your own. “An artist always has a point of view.”

## Self-Mastery

“Singing is a mind-body connection that includes mastery of feelings, anxiety and thought. Performance is very personal and criticism can be difficult. It takes a great deal of self-confidence to approach each criticism constructively,” King says.

“As a vocalist, you are the instrument. Your life experience is a part of interpretation that is fresh all the time. Then, there is always a sense that your body is changing: a unique challenge – the piano, its shape never changes.”

## A World-Class Education

“In a course of study,” King says, “students must learn actual history as well as music history. If they are going to work on Mozart, they will need to learn about him.” What were times like when the composer wrote and performed?

According to King, “This necessitates a thorough liberal arts education,” including language acquisition. “It is relatively easy to train in Italian, and we start with that language.”

“We have to translate the libretto,” Bobeck says. “We can use IPA, International Phonetic Language. If we write that onto the text, we can pronounce it as if we were native speakers. Still, I use dictionaries and want to learn the languages.”

Bobeck has taken four years of Spanish in addition to Italian and German, and through departmental connections with the Vienna School of Music, she was able to travel to Germany and Austria in her junior year.

## Practice, Practice, Practice

According to King, “What is daunting for students is that they listen to professionals and want to sound like them. But, it takes thousands and thousands of hours in the practice rooms to broach mastery as well as discipline of mind, muscle, heart and soul. This all happens in the practice rooms.

“You won’t be able to perform if you don’t practice. Practice until the music can be accessed accurately enough to be replicated, muscle practice, body practice ... loading muscle memory until one piece of music is so well learned that it can be accessed as part of the self, as *self-expression*,” King says. “Students have to have the autonomy to slug it out. That is the path.”

Bobeck appreciates this, “What I like, here, is all the practice I get!”

## Voice

Modern vocal training has benefitted from increased access to scientific and medical knowledge. “There is real science behind our pedagogy,” King says. “It is more physiologically accurate.

“Singing is vocal athletics. As classical musicians, we ask the voice to do superhuman things for a very long time. It is a dangerous thing to sing without formal training. Intuitive singing can produce vocal nodes, laryngitis and inappropriate breath support.”

## Emotive Imagination

Finally, room must be left for mystery, King says. The mystery of music “that moves the human soul is what performers learn to initiate and extend to others: a childlike return to playful imagery, permission to be creative, authoritative and confident.

“Children have the cultivated personal attributes necessary to perform and the multiple intelligences to succeed. But, most of us lose that innate performer within us. Or,” she says, “it is ‘educated’ out of us.”

However, K-12 educators are retooling. King says the widely accepted theory of multiple intelligences provides added support and value for musical intelligence.

Still, many potential musicians are lost. “Parents are dealing with work schedules, and athletics still mean more than music.”

Yet, more and more arts students are applying to UNCW where they are not only supported but also challenged. “It’s not coddling,” Bobeck says, “it’s opportunity they give you.”

King says, “Voice students receive a wide breadth of performance options here, choral, solo; we want them to have it all.”

Bobeck agrees, “She (King) won’t just turn out singers; she will turn out musicians.”



Nancy King

UNCW/JAMIE MONCRIEF

**STUDENTS SAY**  
by JJ Knight '11



# Movies:

## More Than Meets the Eye

Liza and Tim Palmer, co-executive editors of *Film Matters*

**It's movie night.** You step up to the counter, slide your money under the plastic glass. The smell of expensive, buttery popcorn fades as you enter the dimly lit theater, ticket in hand. You search the rows for the perfect seat: middle, center. Scooting past a first date, a gaggle of teens, you sit just as the lights fade. The screen illuminates. You are alone with an unfolding story, an ocular character: the witness for whom the entire production was wrought.

You are a part of the film criticism world. You can learn to see film as a deliberate artistic creation worthy of critical viewing and analysis. Before there were university scholars, film buffs, devoted moviegoers or cinéphiles carried the voice of scholarly inquiry. It was not until the late 1950s, early '60s, that scholarly film criticism was born. And, a wealth of approaches to film evolved – historical, technical, psychological, gender-oriented, etc., forming a new discipline, film studies.

UNC Wilmington entered the formal cinematic conversation when its film studies department was founded in 2003. In 2010, the young department partnered with Intellect, Ltd., to publish *Film Matters (FM)*, the first

international, peer-reviewed journal to specialize in undergraduate film criticism. Based in Bristol, England, Intellect is an independent academic publisher of books and journals in the fields of creative practice and popular culture.

For the first time, undergraduates from around the world have an outlet for their passion for film criticism. Feature articles and a hefty review section give these young film critics the chance to test their mettle. An author biography, mentor biography and department overview acknowledge home programs. And, a new course, Producing the Undergraduate Film Magazine (FST 369), gives UNCW film majors real-world experience in the peer-review process.

"There has been a great response from undergraduates worldwide to have this dedicated venue for their thoughts and scholarly inquiry into film," says Liza Palmer, lecturer for the film studies department and co-editor-in-chief of *Film Matters*.

Carolyn Lake, an undergraduate from Flinders University, Australia, whose article, "Colonial Nation," was featured in the premiere issue of *FM*, summed up undergraduate frustration: "To draw a line at 'graduate' that says 'you must be this tall to publish' feels arbitrary."

"Colonial Nation" and Lake's quote were featured in a subsequent article titled "Film Matters" by Nina Ayoub, published March 2010 in *The Chronicle of Higher Education*.

UNCW students share Lake's passion, seeing film study as a method of extending the viewing experience. Jacob Duvall '11 feels that studying movies critically is valuable because film is such a ubiquitous medium. "Film studies is important because we are inundated with film every day," says Duvall, "and being able to interpret films is vital to understanding what is going on in the world."



Carolyn Lake

Echoing this idea, Tim Palmer, associate professor and co-editor-in-chief of *Film Matters*, sees films as a way to travel through time and space. "Films give us some sort of insight into different people, different places, different time periods," he says. Palmer finds studying film fascinating because it can express many different things. Movies can be political, economically motivated, artistic expressions or even social interventions.

PHOTOS UNCW/JAMIE MONCRIEF



Films can unite or divide, partially or wholly define a culture. Going to the cinema is a way of creating memories. It is a place to go on dates, spend time with friends or be alone in a group with others, sharing the same experience. As one undergraduate film student said, "Even if someone is not exactly caught up in the film world, they can still tell you their favorite film."

Because of its power to affect, film is being used as a form of therapy. In an article, "The Use of Film in Psychotherapy," Jean-Anne Sutherland, assistant professor of sociology at UNCW, discusses how individuals can be challenged or reinforced through the socially accepted and unintimidating medium of film.

"Therapists know that people are more likely to view a movie about addiction than to read a text about the subject... films are a new kind of 'text' through which we are provided stories, frames and representations of social life," she writes. Sutherland asserts that by watching the struggles of onscreen characters, individuals can better come to understand their own. "Films provide an opportunity for clients to view the representation of an otherwise abstract idea," she says.

Becoming a critical viewer means becoming sensitive to a movie's intent and the techniques involved in conveying it. "We shouldn't be naïve viewers and think films just blinked into existence," says Tim Palmer. "Films are constructed things. They are lit. They are designed with certain goals in mind. The actors are blocked. A location is chosen. A script is rehearsed, and [the film] is constructed after the fact in an editing room."



**JJ Knight '11** graduated in May with a B.A. in English, a professional writing certificate and minors in creative writing and journalism. She interned with the *Star-News* and the UNCW Marketing and Communications office and was the first UNCW student to earn the Dow Jones News Fund, Inc. summer internship, serving as a copy editor for *The Hartford Courant*, the nation's oldest continuously published newspaper, in Connecticut.

The Palmers suggest the best way to become a critical viewer is to question. "Try stopping yourself and asking: 'How has this been constructed, for my pleasure or to get a response out of me?'" says Liza Palmer, who admits that before attending film school, she thought movies were shot in sequence and there was no such thing as editing.

Becoming aware of a film as a constructed product isn't easy because, in most cases, films are designed to appear seamless. "It is not until you break things down that you can appreciate the aesthetic decisions that went into making that scene or getting that shot," she says.

To understand the capabilities of film, consume a wider variety of them. Step out of what is comfortable and take on a challenge. Liza Palmer suggests, "If your friend invites you to see a film and you're not that interested, go try it. You'll be surprised by what inspires you." Being a film critic is about actively engaging a film. That engagement, fueled by curiosity, can lead to inspiration.

### Feed Your Curiosity for Film

Tim Palmer says, "It's like eating a Big Mac. We all love Big Macs, but we can't eat them every night," he says. "Just because Mayfaire, most of the time, happens to play 'Big Macs,' seek out other films. It's good for us to broaden our minds."

Diversify the films you consume. Being a film critic is not about filling your mind with cinema trivia, but actively questioning films and the decisions made in creating them. By looking at film with a critical eye, you become aware of all that films can do and mean.

## Nurturing Your Inner Film Critic

"Because of accessibility, there has never been a better time to study and learn about film." — *Tim Palmer*

If popular Hollywood cinema no longer satisfies your intellectual hunger, try older films, foreign films or just films different from your usual tastes. You can expand your palette by viewing films by a director or cinematographer you've enjoyed or follow a celebrity's cinematic career. Check out lower budget movies or a local film festival like *Cucalorus*, Wilmington's annual festival of independent film. Fearlessly try a foreign film or experience time travel by watching an old classic. You can also visit or try places that do not usually serve the mass-produced films, but more diverse films, such as:

- Cinematique Film Series at Thalian Hall
- The Galaxy Cinema in Cary
- Six-Screen Art-House Theater
- MyFrenchFilmFestival
- The Criterion Collection
- Public or Academic Libraries



The vision of the magazine is to celebrate the undergraduate through academic publication. "Peer reviewers are students themselves. Intellect Press offers the publication great design expertise and intensive illustration." — *Tim Palmer*




*Biology's roots lay in the study of ancient Egyptian medicine, the observations of Aristotle and Galen, the discovery and classification of life forms through experimentation by William Harvey and in the 17th century, with the development of the microscope, the world of microbes, invisible to the naked eye and amazingly diverse.*





From 'eyeless' shrimp living at sea bottom to  
Mt. Everest's tiny, black jumping spider *E. omnisuperstes*,  
the variance of species on Earth, their interdependence  
and ecosystem diversity demand a study as multiform and  
ever-evolving as life itself. Derived from the Greek words  
*bios* for life and *logy* for study, biology is that study.



# biology

## Study of Life

by Kim Proukou '06M

Undergraduate biology students choose from a variety of diversified  
courses and topics in anatomy and physiology, aquatic biology,  
biochemistry, cellular biology, conservation biology, coral reef  
preservation, developmental biology, ecology, evolutionary biology,  
fisheries science, forensic science, genetics, histology, kinetics,  
marine biology, microbial life/microbiology, molecular biology,  
mycology, ornithology, plant biology, terrestrial biology and zoology.

By offering a full range of opportunity in the biological sciences,  
UNCW provides an exceptionally strong preparation for many  
post-graduate opportunities, including medical school and the  
health professions.



## Medical School and the Health Professions

*"The practice of medicine demands more than just scientific knowledge – it demands qualities of mind and character – strengthened by a quality, classical liberal arts education."*

— Association of American Medical Colleges report,  
*Physicians for the 21st Century*

For the pre-health professional, there is no standard major. According to Timothy Ballard (below), assistant chair of the department of biology and marine biology and UNCW's primary pre-health professions advisor, "Some of our most successful students have been philosophy, math and English majors." He urges all pre-health students, biology majors or not, to "create a backup career plan to govern their choice of a major," so that no time or money is lost should they not be accepted to a medical, allied or other health professions school.

Proficiency in English, languages, chemistry, math, physics, philosophy, psychology, music and the arts demonstrate academic rigor and are suitable majors or double majors or minors for those planning to apply to medical schools or other health profession schools.

## Superior Advising

For more than 15 years, Ballard has overseen undergraduate preparation and advising for the health professions. His mission: to get students to their career destination as a doctor, dentist, physical therapist, physician's assistant, veterinarian or other health professional. The students' mission: stay on track by keeping your appointments with him and other advisors.

UNCW students interested in the health professions are identified *prior* to freshman orientation. Freshman and sophomore academic advisors Jamie Brenner and Carly Wilson work closely with Ballard.

"Here, if a student identifies as pre-health, we can say, 'you are *required* to see your advisor.' Typically, pre-health advising is voluntary at most schools," Brenner says. At UNCW, "from freshman to senior you will have support for preparing your application and yourself for medical school."



UNCW/JAMIE MONCRIEF



## Mentoring, Training, Discipline

Ballard's style is simple and direct. "Even if you are going to be a biology major, I don't want you being advised in the biology room," he says. "I want you in the health professions room for freshman orientation." Once there, "Jamie (Brenner) will get up and talk about all the good parts; then, I go in."

Ballard's "scare-the-bejeebers-out-of-them" talk is but 15 minutes. It consists of three key points: "This is not 13th grade. This is a meritocracy. You have to hit the ground running."

## Ability, Determination

"I tell students all the time," he says, "There are three kinds of students. There are those that can, who won't – and there are students who will, but can't. What you have to be is one who *can* and *will*."

## Real World Experience

*"By 2025, about 159,000 more physicians will be needed to care for the growing population."— (AMA Convention, Sept. 2010: Preparing Physicians to Care for Patients in the 21st Century)*

For students planning a career in the health professions, direct experience with patients is important. "We try to get them out there volunteering and get them Certified Nursing Assistant (CNA) certificates through Cape Fear Community College," Ballard says. "I think it is important for our students to find out this is not like *ER*. It's not like *Gray's Anatomy*. There are really sick people that (really) die, and you may not like it." Also, many medical schools require experience. Physician assistant schools require it. Physical therapy schools require it. But, "whether required or not," Ballard says, "Experience makes writing that essay about why you want to become a health professional much easier."

**Preserving the scope of biology for students is a priority of UNCW's Department of Biology and Marine Biology. By integrating new and emerging fields within an ever-expanding curriculum, UNCW remains world-class in marine biology and holds established excellence in cellular biology, molecular biology, physiology and genetics.**



UNCW/JAMIE MONCRIEF

The annual North Carolina Missions of Mercy (NCMOM) dental clinic at the Wesley Memorial United Methodist Church on College Road offers UNCW pre-dentistry students hands-on, real-world experience. Each year, NCMOM provides approximately 700 underserved dental patients with services free of charge.

The idea for a free dental clinic began as an Eagle Scout project suggested by Wilmington dentist Bob Plage's son in 2004. Today, the average annual value of services is estimated at \$320,000.

The program that Plage assures "leaves the dental profession better than we (dentists) found it," includes UNCW Spanish professors Terry and Joann Mount, who organize international languages faculty and students to provide interpretation for Spanish-speaking patients. For all student participants, the service learning experience is not-for-credit.

The Southeastern Regional Advisory Committee, which coordinates the regional trauma system, provides medical triage, supplies, tents, power connections and equipment, including X-ray units. Over the years, Plage says, "It has become a real community project. What better way for young people to learn about the importance of giving back?"

"The clinic is a blessing for all who participate. It gives us the chance to help others," Plage says.





## a foot up

In his first year of medical school at Wake Forest University, Martyn Knowles (B.S. biology, summa cum laude '03) joined fellow students newly graduated from Dartmouth, Yale and John Hopkins. "And they sort of looked down their noses at him because he didn't go to one of 'the schools' – until they had to go to the laboratory and use a microscope for the first time. And, Martin was the one who knew how. And, he came back specifically to tell Dillaman and me that."

— Professor Timothy Ballard

Hands-on learning in microscopy and courses that introduce the undergraduate to graduate-level work prepare UNCW students to excel.

Professor Richard Dillaman (left) oversees the university's microscopy labs and teaches vertebrate histology. "Histology is the study of tissues. A pathologist looks at biopsy; we look at normal tissue," he says. "From the structure of tissue, whether muscle tissue, cardiac, skeletal or nervous tissue, organ functioning can be understood."

Other undergraduate courses at UNCW that give students a strong start include embryology, microbiology, immunology, biochemistry, molecular biology and virology.

"These courses really allow our undergraduates to compete and perform when they get into med school, dental school or PA (physician assistant) school," Dillaman says. "Because they will be asked to take a course like this...except it's going to be moving at warp seven instead of warp two when they were here." Many students

UNCW/JAMIE MONCRIEF



return to UNCW to tell him how these courses gave them “a foot up.” Dillaman uses the same textbooks used in most medical schools.

“For example, in histology, when they get to medical school, they will use the same textbook I use.”

According to Dillaman, “There is no substitute for the hands-on experience of microscopy for students. We have an undergraduate doing a project with Dr. Kinsey and me (see page 28). She is going on to medical school with real experience in using the electron microscope that will help her get accepted.

“We are getting brighter and brighter students over the years. These students are competing successfully and getting into medical schools. But, once you get there you have to perform. And, our students do well. When this happens over time, you establish your reputation and the medical schools, the dental schools – they build an opinion of institutions. Some actually turn that into a numerical factor in their admission process. So, it is very important that our students do well once they get there. And, they do!

“Dr. Ballard always kids, ‘You know, when you are lying on a gurney yourself, you don’t want to look up and see your C students, you want to see your A students.’ At UNCW, we work to make them all A students.

“I got an email the other day from one of my students who had been accepted to both ECU and Chapel Hill dental schools. He hasn’t told me yet which one he has decided to attend.”

Professor Richard Dillaman was Shannon Modla’s graduate thesis advisor. Today, Modla is a Research Associate III at Delaware Biotechnology Institute Bioluminescence Center, where she serves as the primary specialist on the facility’s state-of-the-art Zeiss Libra 120 transmission electron microscope.

UNCW/JAMIE MONCRIEF



Shannon Modla '06M  
Transmission Electron Microscopy (TEM) Expert

## Where they are now

In 2008, just two years after graduating, Modla received the Microscopy Society of America’s Professional Technical Staff Award for her study of viruses in marine ecosystems using a scanning electron microscope. The award is given to only four of the organization’s 3,000 members each year.

“Dr. Dillaman taught me the technical skills for preparing samples and collecting images with the microscopes. More importantly, his influence cultivated my critical thinking skills for interpreting images, which is an essential component to being an accomplished microscopist...and provided me with a foundation in biological microscopy, which ultimately led to my current career success.”

Delaware Biotechnology Institute Bioluminescence Center is a multiuser facility with high-end microscopy equipment including confocal, atomic force, and scanning and transmission electron microscopes.

*According to the U.S. Department of Labor, Bureau of Labor Statistics, 10 of the 20 fastest-growing occupations are health related. In addition to shortages in nursing and public health workers, approximately 200 allied health disciplines will have worker shortages.*





# Where they are now

"The UNCW Honors Scholars Program is one of the main reasons I chose to attend UNCW, and it played a major part in where I am today," says Sarah Milliken '03. "The academic opportunities and the independent honors research project gave me a strong scholastic foundation, equipping me for the rigors of medical school. The extracurricular opportunities through

the Honors Scholars Association and other programs enhanced my leadership skills, preparing me for the numerous leadership and professional development opportunities I have had during both medical school and residency.

Several of my best college friends, who are still a huge part of my support system, are UNCW Honors Scholars Program graduates. Without the UNCW Honors Scholars Program, we may have never met. My advice for students planning for a career the health professions and considering the UNCW Honors Scholars Program, jump at the opportunity and all it has to offer. I am definitely glad I did," Milliken says.

Milliken is finishing her third year of pediatric residency at Michigan State University and serving at the Helen DeVos Children's Hospital in Grand Rapids, Michigan. In July, she will start a three-year anesthesiology residency at the University of Colorado Denver. "This will probably be followed by one-year pediatric anesthesiology fellowship," she says. "In the end, I will eligible for board certification in pediatrics, anesthesia and pediatric anesthesia." Milliken says, "Life is good, but busy!"

***"The UNCW Honors Scholars Program is one of the main reasons I chose to attend UNCW, and it has played a major part in where I am today." — Sarah Milliken '03***

PHOTO BY JENNIFER ALEXANDER MD

## The Honors Program

**Graduate schools want to see proof of a student's abilities.**

"We get them to understand – and sometimes it's getting their parents to understand," Ballard says, "that a pre-med or pre-dent student has to carry a tough academic load. Over the course of three years – prior to when they start applying for graduate school – they want to demonstrate they can handle academic rigor."

The Honors Scholar Program is a community of students with a shared commitment to academic excellence and personal achievement. Honors classes are restricted to students formally enrolled in the Honors Scholars Program or others admitted only by permission of the honors director after consultation with the course instructor. Honors courses are more difficult. They are also smaller. According to Academic Advisor Jamie Brenner, "You get to know your professors better, which can lead to really strong recommendations."

The result of honors course work is summarized in a required research paper, which may be submitted for publication. Students present their research orally before an examining committee, as well. Brenner says, "GPA and Entrance Exam Scores – when met – they look like all the rest. Research experience expands your profile."

"It certainly helped to have an undergraduate honors thesis on my resume! It provided me opportunities for adult learning, a chance to do independent and creative thinking about a project that I was truly interested in – as well as space to grow and gain confidence as I prepared and presented my defense," says Jennifer M. Nomides '03 MPH (Master of Public Health), MS4 (Medical School 4th year), UNC School of Medicine.

Three kinds of honors interdisciplinary seminars are offered each year. Honors 110 is a team-taught, three-hour course that introduces all freshman honors students to the college experience through the practice of research, service and leadership activities. Honors 120 is a one-hour enrichment seminar that requires participation in campus visual/performing/cultural events, lectures or research activities. Honors 210 is a three-hour interdisciplinary course that investigates questions using approaches from several disciplines. Many honors experiential-learning seminars include travel abroad. And, all honors students are encouraged to join Honors International and to qualify for Honors Global Citizenship Recognition, a distinction that recognizes students' understanding of global issues, foreign language competency, as well as study abroad experiences.



# Honors is a Special Place

Located on the second floor of Randall Library, Honors Program spaces include a seminar room, reading room and large conference area with media center. The seminar room provides space for honors special classes designed to foster close working relationships between tenured faculty and students.

The Center for Support of Undergraduate Research and Fellowships (CSURF) is housed in the Honors Scholars Program Office. Here you can find information on how to apply for funding to carry out a research project. You can learn how to present your project to a professional audience. You will also find national competitive scholarships and fellowships and learn how to apply for them.

Special opportunities include service on the honors media board that produces video, a newsletter and an honors arts publication as well as other media. In the library area outside the program offices, there are places for group and independent study as well as collaboration. All first-year honors students reside at Honors House, a central campus gathering point. More than a program, Honors is an exceptional place where high-achieving students realize their full potential within a supportive community of advanced learners.

## Randall Library: **STUDY for LIFE**

Located at the heart of campus, Randall Library contains excellent book and journal collections, and librarians offer instruction in research methods and study. Special Collections, located at the opposite corner to Honors Program offices, houses rare books, manuscripts and archival collections. These collections offer students unique connections to a subject or researcher's life or methods – through the experience of memoir, rare book, manuscript, photograph or art work. Examples that support learning in the biological sciences include:

- North Carolina Coastal Federation papers that span 25 years of environmental investigations of the state's coastal water quality and natural resources as well as the federation's educational advocacy, habitat preservation and restoration efforts. This record of coastal resources, challenges and mitigation strategies offers students excellent source material.
- The papers of UNCW biology professor and ornithologist James Parnell. Parnell completed the first colonial bird count ever conducted in North Carolina.
- Donations from UNCW's first professor in marine biology, Ralph Brauer include a significant portion of the Gillen History of Medicine Collection, 3,500 books written in French, German, English, Italian, Arabic, Greek and Latin, as well as a 500-book history of science collection.
- The Thomas Fanning Wood Collection, including lab reports and pollution studies of the Cape Fear River from the post-Civil War era. *Wilmington Flora*, written by Wood and published in 1886, records regional flora, including dates of bloom at that time.
- *The Natural History of Carolina, Florida and the Bahamas Islands* by Mark Catesby, 3rd edition, published in 1771, is an extraordinary book of hand-drawn illustrations of birds and wildlife of the region. In color and detail, these studies are both art and science.

"The Red Bird"





# My Adventure to Scotland

by Emily Jones '10M

In January 2010, my last year of environmental studies graduate school was fast approaching. Although I had always considered, even

dreamed, of studying abroad, I had never actually taken the leap or considered entering into one of the amazing international programs the university has to offer.

Honestly, I had never even been on an airplane. But, that all changed one afternoon while I was waiting in the hall for class to begin. On the wall, I noticed a flyer for a summer study abroad session on natural resource policy and management in Scotland.



The description focused on courses that applied to Scotland's natural resource management and national park system, comparing and contrasting to United States' systems. The course trip was offered to undergraduate and graduate students in several majors, including environmental studies, public administration, biology, parks and recreation and business. Three of my fellow environmental studies graduate students and I decided to sign up immediately.

As soon as we landed in the "land of green," as people often refer to Scotland due to the abundance of lush greenery that spreads throughout, I knew I had made an excellent decision to come on the trip. Our professors, Bob Buerger, environmental studies, and Jim Herstine, School of Health and Applied Human Sciences, met us at our new school-away-from-school, the University of Stirling. They showed us around campus and the town of Stirling, a former ancient burgh that lies between the Scottish lowlands and highlands and was once the capital of Scotland.

Classes started the following day. The coursework was a well-balanced combination of in-class lectures from professors at Stirling University and professionals from non-governmental environmental agencies, as well as almost daily field trips that gave us the opportunity to see the beauty of Scotland and compare and contrast environmental management practices.

We visited Loch Lomond, the Trossachs and Cairngorms National Park, where we learned about Scotland's national park system, which has been in place only since 2000. In contrast to the United States' national park system of largely undeveloped land, Scotland's national parks have residential and commercial properties built throughout them.

One weekend, we took a field trip to Fort Williams where we hiked Ben Nevis, the highest mountain in the United Kingdom. We stayed for several days on the Isle of Rum, a national nature reserve on the west coast of Scotland, where we learned about deer management as





## Both in the U.S. and in Scotland, we are fighting for the same cause: a healthy and beautiful planet.

well as the history of the isle, which is home to only 20 people full-time. The trip showcased the natural beauty of a place still inhabited mainly by plants and animals.

All of our field trips helped us gather information for our final research projects, which we presented at the end of the course. I chose to compare and contrast United States' park service rangers with those in Scotland, which has no overarching system that employs or maintains standards for rangers. Each location hires its own rangers, and often there is miscommunication and confusion among Scottish park rangers. In the U.S., the government employs park rangers to work as one cohesive unit at three levels: county, state and national. From my research, field trips and project, my overall conclusion about the two systems was that Scotland is still attempting to build and

improve theirs, modeling the U.S. system for efficiency.

Throughout my adventure, I noted how environmentalists in the U.S. differ from those in Scotland, where they must work to rebuild lands destroyed in the past – as opposed to working to maintain and preserve the country's beauty and productivity – as we do in the United States.

Replacing and repopulating the land with native trees is a significant environmental effort in Scotland where in the past, most of the trees had been cut and forested. I learned an important lesson: it is a lot harder to restore the environment than to preserve it. But, both in the U.S. and in Scotland, we are fighting for the same cause, a healthy and beautiful planet.

## Reflections

My experience studying abroad in Scotland changed my views about the United States and our environmental efforts. Learning about Scotland's history, how they destroyed their land and are now scrambling to rebuild its natural beauty, made me realize that the United States' environmental efforts are far more important than I had previously thought.

Here, we fight to maintain the land that we have kept glorious for so many years and work to solve issues that hinder our country from being as green as it can be. I left for Scotland believing that I would return appalled by how America treats their environment. Yet, I returned home feeling positive. And, more importantly, impressed by the green movement in the U.S.

This summer 2011, the natural resource policy and management study abroad session will invite a new cohort of students to Europe to learn how Germany, Austria, Belgium and Switzerland's natural resource policies compare and contrast to those of the U.S.

For those that have never traveled abroad before or for veteran travelers, studying abroad is one of the greatest opportunities imaginable because you can combine your passion, what you are going to school for, with the experience of seeing the world!

Samuel Johnson once wrote, "The use of traveling is to regulate imagination by reality, and instead of thinking how things may be, to see them as they are." This quote is one I have chosen to live by and one in which I challenge others to embrace.



# Mystery, IDENTITY and *Religious Practice*

“Science, especially social science, has neglected the study of religious behavior in recent years, specifically religious experiences.” — Josh Tuttle '11M

by Lindsay Key '11MFA

It's an unforgettable intersection – the moment a public sociologist comes face to face with his or her living, breathing research topic.

For Josh Tuttle, a graduate student in UNC Wilmington's criminology and public sociology master's program, the moment happened when he set foot inside St. Mary's Catholic Church of Wilmington. He was meeting Pastor Bob Kus to talk about the church's large Hispanic population, which constitutes one-sixth of the parish's 6,000-person congregation.

For his master's thesis, Tuttle is examining how social forces, such as education, race, gender

and socioeconomic status, affect a person's participation in church and other religious practices. Specifically, he is interested in Catholicism, a religion on the rise in the United States and thought to be growing with the Hispanic population. Catholicism is the dominant religion of Mexico.

Interviewing Kus was an eye-opening experience for Tuttle. Kus, who has a Ph.D. in sociology, gave him a tour and information about programs for Hispanic parishioners: free translation, a young adult ministry, parades and festivals, funerals, baptisms, communions, prayer groups and masses in Spanish.

The visit affirmed Tuttle's hypothesis developed from previous literature and analysis-based research: the church can serve as a proxy for culture among populations that are disadvantaged or alienated in a particular society. He addresses this in his final thesis paper.

“I think you see higher levels of participation among these groups because they're looking to the church to get material and social resources,” Tuttle says. Plus, the cultural exchanges that a church like St. Mary's offers creates a comforting and encouraging sense of community and cultural identity.





As part of his research, Tuttle reviewed literature and analyzed results from the 2007 U.S. Religious Landscape Survey – a data set compiled by the Pew Research Center in which approximately 30,000 Americans were randomly surveyed regarding their political beliefs, religious beliefs, religious behavior and demographic data. The center used a random telephone dialing method to select respondents around the country.

“Since it’s random and there are so many respondents, the laws of probability ensure that it represents the actual behaviors and opinions of the American population,” Tuttle says. “So any results from my statistical tests should be applicable to the entire United States.”

In addition to Hispanics, Tuttle is also interested in studying how other social groups interact with the church, such as African Americans and females. He is interested in how ethnic groups differ when it comes to church attendance, time spent praying, worship and belief in heaven and hell.

Tuttle’s interest in religion formed when he was an undergraduate student at the University of Maine, studying with Kyriacos Markides, a researcher of religious experiences and Christian mysticism. Tuttle was exposed to various texts describing shamans, monks and holy men in the Mediterranean region, as well as accounts of Markides’ own religious experiences. Knowing Markides to be a “very rational, credible, social scientist,” Tuttle became interested in the mystery surrounding extreme religious experiences.

“Science, especially social science, has neglected the study of religious behavior in recent years, specifically religious experiences,” Tuttle says.

Tuttle’s other academic interests include the sociology of education, social movements and



Pastor Bob Kus, St. Mary’s Catholic Church, Wilmington

general sociological theory. In summer 2010, he gained first-hand data collection experience when he worked as a census enumerator for the U.S. Census Bureau. He also collected and compiled information about student-directed independent studies for UNCW’s College of Arts and Sciences. Currently, he works for associate professor Leslie Hossfeld as a graduate assistant and coordinator of the Southeastern North Carolina Food Systems Program (SENCFS).

Robert Miller, professor of sociology and criminal justice and Tuttle’s thesis director, says that Tuttle’s skills in data analysis, theory comprehension and data presentation position him to pursue a doctorate degree.

“He’s a quick learner,” Miller says. “Plus, his research interest is a current topic that needs further research.”

Following graduation, Tuttle will pursue a Ph.D. in sociology at George Mason University.





MIKE POLITO

If anyone understands migration patterns, Rebecka Brasso '13PhD does. Brasso graduated with a bachelor's degree in marine biology in 2004 before returning in 2009 to UNCW for Ph.D. work. The knowledge she gained along the way, earning a master's degree in biology at the College of William and Mary and working as a biology instructor at Randolph College, has helped to prepare her for the biggest research project yet: investigating mercury levels in the Antarctic, using penguins as bio-monitors.

"I've wanted to be on a penguin project since I was 19," Brasso says. She was pulled onto the project after contacting UNC Wilmington biology and marine biology professor Steve Emslie for advice about applying to Ph.D. programs. Emslie, a marine ornithologist, was Brasso's undergraduate mentor and honors thesis director. He has been researching birds for more than 30 years.

"When she came up with the project to look at mercury in penguin tissues, I thought it was a great fit to my Antarctic research," Emslie says. Preservation of penguin tissue (eggshell membrane and feathers) is both efficient and effective in the freezing temperatures of the Antarctic. Emslie has a collection that radiocarbon-dates as far

# Ph.D.

## Student Examines Levels of Mercury in Penguins

by Lindsay Key '11MFA

back as 40,000 years. All of the specimens came from abandoned penguin colonies, where Emslie excavated ornithogenic, or bird formed, soils.

In 2010, Brasso added more samples to the collection on an Antarctic cruise aboard the vessel *National Geographic Explorer* with fellow biology and marine biology graduate student Mike Polito, who examines the diets and foraging habitat of Antarctic penguins using stable isotope analysis.

Emslie, Polito and Brasso make up the university's "penguin team" conducting outreach projects in the community to educate people about penguins. Prior to leaving for the cruise, all three plus Emslie's new undergraduate Honors student, Chelsea McDougall '11, visited second and fourth grade classes at Codrington and Gregory Elementary schools, and each kept a running blog and dialogue with the students while in Antarctica.

A recent batch of eggshells from the cruise will help Brasso complete a timeline of mercury concentrations in the Southern Ocean over the past 10,000 years. Mercury is one of the most common and toxic contaminants present in the marine environment today. It is released into the atmosphere when fossil fuels are burned and easily transported around the globe to the most remote environments. A biomagnifier, mercury concentrations increase with each step in the food web.

For example, bacteria convert mercury present in the ocean into an organic form that is consumed by phytoplankton, and then zooplankton, krill,



penguins and fish, and ultimately, killer whales, seals and humans. Since penguins are significantly high up in the food web, the element is magnified and highly concentrated once it enters their bodies. Brasso explains that because mercury binds to proteins, researchers can use eggshells and feathers (with high protein content) to monitor mercury levels in the penguins.

Long periods of mercury exposure are damaging to a bird: it is a potent neurotoxin that leads to a decrease in egg laying, hatching and chick survival.

When studying for her master's thesis project, Brasso saw these effects firsthand in tree swallows. For the project, she and teammates built more than 200 birdhouse boxes in the Shenandoah Valley to attract cavity-nesting

birds. Their box design, which incorporates a square piece of sheet metal, a drinking straw, a piece of duct tape and a monofilament line was published in the *Journal of Field Ornithology* in 2008, and recognized for its nearly invisible trap door able to trick even the wariest birds. Once the birds were captured, blood and feather samples were taken and tested for mercury contamination.

"In the boxes, we could handle them so they wouldn't be phased," Brasso says. "The mercury levels in those tree swallows were the highest reported in that species."

Establishing a baseline understanding of mercury levels in remote parts of our planet by using birds as bio-monitors is a new line of research that excites Brasso.

"It's hard going against companies to assess damage when you can't put a clear label on how it's impacting the environment and what it all means," Brasso says. She will continue to build data on mercury levels in penguins by sampling penguin tissues across the Southern Hemisphere, in Antarctica, New Zealand, Africa and South America.

Preliminary data suggests that current levels of mercury in brush-tailed penguins are too low to cause reproductive impairment or decreased survival. However, Brasso thinks the significant impacts of global climate change occurring in the Antarctic Peninsula may change that.

Visit [www.uncw.edu/penguins](http://www.uncw.edu/penguins) to learn more about this and other projects or to view recent blogs from Antarctica.





Graduate liberal studies student Bonnie Monteleone knew little about gyres when she walked into biology lecturer Diane Melroy's science writing course. But, within a year she found herself in the middle of these "ocean whirlpools," compounding samples for her Graduate Liberal Studies thesis research project.



GWEN LATTIN

# Student collaborates with oceanographers to study plastic pollution

by Lindsay Key '11MFA

In oceanography, a gyre is a large system of rotating ocean currents fueled by wind patterns, similar in planetary role to the circulation system in a human body. The five most notable ocean gyres occur in the North Atlantic, South Atlantic, North Pacific, South Pacific and Indian oceans.

Bonnie Monteleone became concerned about the trash heaps spinning in these gyres when, for her science writing class, she read Susan Casey's "Plastic Ocean," first published in *Best Life*, November 2006.

The article stated that because gyres function very similarly to whirlpools, plastic trash is likely to end up in the center and sit – for years.

"I immediately chose the topic for my thesis project," Monteleone recalls. "I had to know if the garbage patch in the North Pacific was an urban legend. I also wanted to know about the North Atlantic gyre."

Monteleone has a unique advantage as a graduate student: her role as administrative associate in the chemistry department puts her, literally, within feet of chemists with years of oceanography experience. She approached Brooks Avery, associate professor of chemistry, who encouraged her to submit a volunteer application to Algalita, a California-based marine research foundation whose members study plastics in the sea.

She also contacted Bill Cooper, former UNC Wilmington chemistry department chair who relocated to the University of California Irvine in 2006. But when she told him about her thesis project, he was skeptical.

"She called me up and I told her, 'Bonnie, listen, you cannot believe everything that is written. Plastics can't be a problem in the ocean,'" Cooper recalls. But nevertheless, the civil and environmental engineering professor decided to attend a group lecture given by Algalita founder Charles Moore at UC Irvine a few weeks later.

Cooper says, "When Moore started showing us samples of the garbage patch and talking



about it, I called Bonnie up that night and said 'not only is there a garbage patch in the North Pacific, but it's worse than I ever imagined.'" Cooper called an old friend at the Bermuda Institute of Ocean Science, who agreed to let him use the institute's research boat, the *R/V Atlantic Explorer*, for an expedition in the North Atlantic gyre the following summer.

In July 2009, Cooper, Monteleone, Jennifer O'Keefe (Monteleone's friend and coordinator of Keep America Beautiful of New Hanover County), Cooper's postdoctoral student Michael Gonsior and two graduate students from Virginia Commonwealth University set sail. The team sampled the water using a manta trawl – a net system used for sampling the surface waters of the ocean. Every sample came back with plastic.

The trouble with plastic, Monteleone explains, is that it is made to last. It could take between 400 and 1,000 years to break down. Although there is evidence that the movement and make-up of the ocean does alter form – large plastics can shrink or fragment – the mass quantity of unresolved plastic in the ocean is devastating to marine animals and birds.

During the North Atlantic gyre expedition, the team discovered a floating motor oil bottle and scooped it up with a hand held net. When they cut the plastic bottle apart, they found a blue spotted fish trapped inside, having grown so large that it could not escape.



BONNIE MONTELEONE

Meanwhile, bite marks on camera film samples indicate that fish feed on plastic, likely mistaking it for food. When a fish consumes a plastic, chemicals from the plastic end up in the tissues, Monteleone explains, and many plastics are made with chemicals that mimic estrogen. Some scientists believe that plastics could play a prominent role in the changing reproductive lives of fish – not to mention the humans and other animals eating the fish.

"People like to say there's a link between human health and plastics," Cooper says. "I'm not sure about that, but we do know that a million birds die a year because of plastic ingestion, and about a hundred thousand sea mammals and animals are injured or killed."

Later in 2009, Monteleone and Cooper cruised the North Pacific gyre with Moore, whom they'd kept in touch with since the beginning of the project. Results were the same.

"We did 54 trawls and every trawl, we found plastic," Cooper says. The same was true for the South Atlantic gyre, which Monteleone sampled in November 2010, and for Bermuda beaches, which Monteleone, Cooper, O'Keefe and UNC Wilmington chemistry professor Pam Seaton sampled in the summer of 2010.

Meanwhile, scientists who make up UNC Wilmington's Marine and Atmospheric Chemistry Research Laboratory (MACRL) team are collaborating with Monteleone on the project. They and their students are researching the impact plastics have on organic compounds in seawater, and what role light (photochemistry) plays in these reactions.

"Taking it to the next step, we wanted to look at a molecular level analysis of the plastic," says Avery, one of the six MACRL scientists that include Joan Willey, Bob Kieber, Ralph Mead, Steve Skrabal and Pam Seaton.

Avery's directed independent study student Hannah Goodwin '11 is working most closely with the samples that Monteleone provides, and both Monteleone and Avery are directing her work.

Meanwhile, Monteleone continues to plan sampling trips and participate in public discussion promoting plastic pollution awareness. Although she graduates in May 2011, she has no intention of abandoning the project. She keeps a running blog about her discoveries ([www.theplasticocean.blogspot.com](http://www.theplasticocean.blogspot.com)) and was featured in *Sea Voices*, a book commemorating the world's leading ocean experts, scientists, environmentally conscious celebrities, musicians, authors, artists, etc.



JIM MANLEY

**"The trouble with plastic," Monteleone explains, "is that it is made to last. It could take between 400 and 1,000 years to break down."**



# LIBERAL ARTS

## A Look at UNCW's Graduate Liberal Studies Program

by Lindsay Key '11MFA



In fall 2011, Herb Berg will become interim director of international studies, the university's newest major. Supporting UNCW's strategic goal to prepare students to be global citizens, this major will encourage students to explore what it means to be a 21st century scholar in an increasingly interdependent world community.

For the motivated, intellectually curious learner, a graduate liberal studies program is like a box of chocolates. It offers students a rich sampling of academic topics that encourage critical thinking and writing, thoughtful discussion and creative problem solving.

The multidisciplinary approach of UNCW's Graduate Liberal Studies (GLS) program allows students to develop a unique perspective – connecting topics as diverse as history, literature, science, gerontology, religion, art and more – with their own research and learning experience.

In 1953, Wesleyan University established the first GLS program in the United States, and since then, hundreds of universities have followed suit, resulting in the formation of the Association of Graduate Liberal Studies Programs (AGLSP) in 1975. Today, AGLSP is an international organization representing more than 120 institutional members ranging from small liberal arts colleges to Research I universities.

### Blurring Borders

Herb Berg, director of liberal studies and professor of philosophy and religion, has led UNC Wilmington's GLS program for five years. By nature, a liberal studies degree is interdisciplinary so faculty include professors from academic departments throughout the College of Arts and Sciences. Courses blur the boundaries of disciplines – encouraging students to address problems, issues and investigations that require research and learning in more than one field. Courses such as History of the Unconscious, exploring themes in Jungian psychology; Poetics of Ecology, environmental writing and thinking; Women in Film, a study of themes and history of both women and film; and Ocean and Coastal Law are all examples of the array of issues that can be explored in an interdisciplinary course. Topics in the program often require study in several fields, attracting students to the program from various undergraduate majors, or with more than one degree and/or years of professional experience.

Berg says he accepted the director position in addition to his regular teaching job because he believes strongly in the value of such a program.



As a professor, it allows him to introduce courses that may not fit perfectly into one discipline or a more narrowly focused graduate degree.

"Many master's programs rightly focus on narrow topics and methodologies," Berg says. "But many issues that confront people today resist such one-sided analyses and approaches. Our students are encouraged to draw on a wide range of disciplines and perspectives as they pursue those topics which are meaningful to them."

Graduate liberal studies courses not only encourage free investigation of interdisciplinary work, but also timely and topical investigations; for example, classes like The Social Organization of Cruelty, The Political Voice of Punk or The Sociology of Athletic Heroes. Students may pursue creative, artistic achievement as well. Because of their breadth, GLS courses are very popular with MFA creative writing students and graduate students studying literature or cultural studies. And, while grounded in the local campus community, many courses are online.

## Gaining Focus

Exploring diverse topics, students often find a special interest. "Students come in, and they don't necessarily know what they're going to do," says Mika Elovaara, assistant director of GLS. "They're just interested in continuing in higher education and learning, and while they're in our program, they often end up finding a focus for the rest of their careers."

"Many have gone onto careers in public education, but what best describes the careers of our alumni is that they do find their own, more individual career paths. Some have become published authors, others find employment, while still others continued onto Ph.D. programs. This really shows that you can find your own path with a degree in GLS."

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Amanda Gonzalez-Moreno

Amanda Gonzalez-Moreno '09 was one of those students. "The liberal studies program offers a great variety of courses focused on writing, an area I was particularly interested in developing to further my career. I was able to participate in workshops with outstanding teachers such as Kimi Faxon Hemingway '05MFA, who is devoted to the craft of writing and ensuring that students reach their full potential," Gonzalez-Moreno says.

Diana Ashe, associate professor of English, directed Gonzalez-Moreno's final project for the GLS degree, a research-based oral histories paper about three mothers and their firsthand experiences with the chemical Bisphenol A (BPA). Ashe's direction of the final project is an example of the collaboration between GLS and other departments.

GLS students have a lot of freedom in creating their final project, which is the equivalent of a thesis in the discipline-specific graduate programs, and can range from a conventional research paper to creative work of art or documentary film.

For her project, Gonzalez-Moreno explored the fields of law and biology. She was invited to formally present her paper, "The Plastic Baby Bottle Dilemma: Oral Histories," at the 2011 Regional Graduate Liberal Studies conference held at the University of North Carolina Asheville on April 9.

A recipient of a GLS graduate assistantship and tuition remission, Gonzalez-Moreno is "extremely grateful to the Graduate Liberal Studies Program for the financial support it offered me and for the opportunity to further my knowledge from a multidisciplinary perspective," she says.

Chosen as a Soaring Seahawk, she finished her GLS degree in December 2009 and is pursuing an MFA in Creative Writing at UNCW. She came to the university with her husband, who is a Ph.D. candidate in marine biology. Her two degrees will advance her research and writing skills. She plans to become a writer and editor.

## Online Courses

Since the fall of 2009, the GLS program has offered online courses. Using the latest technologies, students can now collaborate, share and interact as if they were actually in class. "When we agreed to develop an online component to our program, we committed to offering enough online courses to allow students to finish the degree online," Elovaara says.



Mika Elovaara

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The online courses have been particularly useful to students in the military. Courses are delivered using a variety of software and learning environments, video-conferencing, message boards and other applications. Students living as far away as Germany, Italy and California or as near as Raleigh and Winston-Salem as well as local students working full time need not worry that "they can only take courses that start at 6:30 p.m.," Elovaara says. "It's a win-win situation for everyone. We are able to retain the students, and the students are able to finish the degree."

"One of the best things I did to improve the GLS program was to hire Mika," Berg says. Elovaara serves as the coordinator for the GLS internship program in the UNCW Writing Center and as coordinator of the GLS post-master's certificate program that requires 20 hours beyond the master's level in Graduate Liberal Studies.

GLS administrators continue to devise creative solutions to grow the program and increase course offerings. A rise in applicants has required increased student support.

In fall 2011, Berg leaves his GLS post to become interim director of international studies, a new major. According to Elovaara, "the new director will inherit a graduate program in great standing."



## THE LAST WORD

"I've learned valuable techniques including how to fix tissue in order to observe using a transmission electron microscope. I've learned the statistics required to analyze my data. In the graduate programs where I applied, the faculty was very interested in both my research experience and what I learned.

"I was accepted to UNC-Chapel Hill, Emory, Duke and Case Western universities and have decided to join the Biological and Biomedical Sciences program at UNC-Chapel Hill in the fall where I will pursue a Ph.D. in biomedical research" — Robbie McNeill '11

**Is a spot in a laboratory supported by the National Science Foundation and National Institute of Arthritis and Musculoskeletal and Skin Diseases – with a funding history of more than \$3 million – out of reach for an undergraduate?**

### Not at UNCW.

Since 2003, 28 honors and directed independent study undergrads and one high school student have participated in award-winning basic research alongside 10 graduate students and three doctoral students in Stephen Kinsey's Integrative and Comparative Biology Lab.

UNCW professor and graduate coordinator Kinsey collaborates with UNCW Professor of Biology Dick Dillaman and Bruce Locke, chair of the Department of Chemical and Biomedical Engineering at Florida A&M-Florida State University College of Engineering, to investigate tissue modification, "what I think of as real bioengineering, developing, modifying tissues," Kinsey says. "What we are focusing on is muscles... how you build a muscle and then modify it, applying bioengineering principles for that purpose."

Muscle is such a large percentage of body mass "but it has a low metabolic rate relative to other tissues, like – say liver or brain – unless you exercise. When you exercise, then it has a high metabolic rate," Kinsey says.

The relation of metabolic rate to body size has remained a puzzle that biologists, biochemists, physicians and others have sought to solve for a long time. Mice have a Basal Metabolic Rate (BMR/kg) relative to size that is 13 times that of elephants. A human baby's BMR is more than twice that of an adult.



Why, as body size increases, does BMR decrease? Studies in Kinsey's lab may provide a link between the mechanisms of muscle growth and whole animal metabolic rate.

"There is great interest in manipulating both muscle growth and metabolic rate as a means of mitigating some of the negative consequences of disease," Kinsey says. "Changing activity levels can also ameliorate some of the problems with diseases."

## Molecules Push Through Tough Runs

In metabolic pathways, molecular movement never runs straight as an arrow. Diffusing molecules must clear tight cellular spaces and hurdle macromolecules like nucleic acids, DNA, RNA and proteins. A full understanding of metabolism requires knowledge of the reactions and the way molecules move between reaction centers.

Borrowing modeling techniques from chemical engineering and operations research, Kinsey and his students seek to better understand the reaction-diffusion mechanics that underlie the interactive communication of cells among themselves, as well as within their environment as molecules traverse tough runs.

"I used to spend a lot of time trying to do mathematical analyses myself," Kinsey says. Then "I started working with engineers and realized I was wasting my time, because that's what they do for a living. What I really need to do is train the engineering people to think more biologically, and they need to train me to think more like an engineer."

Kinsey, Dillaman and Locke successfully share their thinking to find answers to questions about how muscle cell form dictates function. They study many different animals – lobsters, crabs, fishes and mice. While metabolic pathways and components are remarkably similar among species, some animals have muscular structures and patterns particularly well suited to the examination of certain metabolic processes.

Kinsey, Locke and their students collaborate in virtual online meetings weekly from Randall Library – telecommuting shared findings and planning new experiments.

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(Photo above left, L to R, clockwise)

Lena Donnarumma '13, doctoral candidates Ana Jimenez and Carolina Priester, Trent Ross '11M, Scott Royal '11, Professor Stephen Kinsey, Robbie McNeill '11, Kathleen Robbins '12 and Ashley Mehlman '11.





# THE LAST WORD:

**Undergraduate Opportunities in Integrative  
Research: The Kinsey Lab**

by Kim Proukou '06M

**“Muscle is an unusual tissue because you can  
increase its metabolic rate simply by moving.”  
— Professor Stephen Kinsey**

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